

submitted was disapproved, because the views were not numbered separately, and because the sectional line "A-A" was not proper.

Applicant now submit a proposed drawing correction which adds Figs 7 and 8, in which the two views are numbered separately and the sectional view is designated as "8-8", which is in accordance with 37 CFR 1.84(h)(3)). These two figures illustrate only that which has already been described in the specification, and no new matter is presented.

If the Examiner will indicate his approval of the proposed drawing, Applicants will arrange for submission of formal drawings.

Claims 1-16 and 17-22 stand rejected under 35 U.S.C. 112, first paragraph, as the Examiner does not see support in the original specification for the disc being one-piece.

It is, of course, now well-settled that the subject matter of a claim need not be described literally (i.e., using the same terms or *in haec verba*) in order for the disclosure to satisfy the description requirement. Possession of the invention may be shown in a variety of ways, including description of an actual reduction to practice.

At page 12, Applicants describe the actual production of test pieces of the claimed static mixer module by injection molding (line 24), and also disclose that the

claimed static mixer module can be manufactured by the simple casting technique (line 35). Every person skilled in the art would know that the static mixer modules described in those passages are one-piece modules.

Accordingly, the specification does, in fact, support the limitation "one-piece", and the rejection of claims 1-16 and 17-22 under 35 U.S.C. 112, first paragraph, should now be withdrawn.

Claims 22 and 17 stand rejected under 35 U.S.C. 112, first paragraph, because the Examiner views them as not enabled. More specifically, the Examiner finds it unclear what is being claimed, but to the extent understood, not enabled. The Examiner suggests that, while a module engaging into a void defined by the boundaries of another module is enabled, two modules which occupy the same region is not.

Applicants gratefully acknowledge the Examiner's suggestion, and have amended the claim in accordance therewith. In addition, additional parts of the claims have been rephrased to address further issues raised by the Examiner in the 35 U.S.C. 112, second paragraph rejection. It is believed that the rephrasing of the claim, and the incorporation of the language suggested by the Examiner, overcomes all of the 35 U.S.C. 112 issues raised in this office action, and the present rejection, as well as the 35 U.S.C. 112, second paragraph, rejection of claims 17 and 22 should now be withdrawn.

Claims 1-15 and 17-22 stand rejected under 35 U.S.C. 112, second paragraph, for a variety of reasons indicated in pages 3-6 of the Office Action.

Claims 17 and 22 have been addressed above.

With respect to the remainder of the claims included in this rejection, extensive rephrasing has been implemented, and/or appropriate amendments made to address each of the issues raised in this rejection.

The following general comments apply:

The term "flanks" has been replaced throughout the claims by the expression -- walls defining the channels--, and in claim 1, the channels are described as --defined by channel walls--. It is very clear from the description that the expression "flanks" means the walls of and which define the channels. In this regard, the Examiner's attention is respectfully drawn to original drawing Figure 1c, and the language describing it at page 10, lines 13-16. This language, when read in view of the figure, shows that there are channels 6, which are located in "flanks" 8 of inlet channel 4. In the figure, it is clear that the "flanks 8" is, in fact, a wall which defined the channels. In addition, it can be seen that the orifices pass through the wall.

Thus the amendment of "flanks" to "walls" introduces no new matter, but rather more accurately defines what is described and shown in the specification and drawings.

Claim 1 now recites that the disc has ~~—a front side and a rear side—~~, providing antecedent support for the later recitation of the front and rear sides.

With respect to the disc plane recited in the specification and original claims, it is clear to any person skilled in the art that this means the plane what would span the surface of the front side of the disc or the rear side of the disc, and that the distance between such two planes can be different, depending on the regions of the front or rear side of the disc upon which that plane rests. In order to clarify this, Applicants have now referred to said planes as being defined by the circumference of the disc. Thus, a circumference is a circle, and can lie in only one plane. This does not introduce any new matter, as it only rephrases that which is already described, in clearer terms.

In claim 4, the expression "mid axis" has been replaced by ~~—center-line of the orifices—~~. Clearly, that is what the expression "mid axis" refers to, in the context of the specification and original claims. This is especially clear when one views the line 16 in Fig. 2, and reads the description of same at page 10, lines 23-24. It is quite clear that the line 16 is the center-line of the orifice.

In claim 14, the mixing channels and the inlet channels all find antecedent support in claim 1. Claim 14 depends from claim 13, which depends from claim 12, which recites the mixer module of claim 1.

It is believed that the amendments made, together with the foregoing comments,

obviate the reasons for this rejection, and the rejection of claims 1-15 and 17-22 under 35 U.S.C. 112, second paragraph, should now be withdrawn.

Claims 1, 2, 5-10 and 20 stand rejected under 35 U.S.C. 102(b) as anticipated by Pellerin (US 4,295,458). The Examiner sees Pellerin as disclosing a static mixer module comprising a one-piece disc which is provided with a multiplicity of orifices and having channels.

Pellerin does not, however, have any disc that is provided with a multiplicity of orifices. Pellerin discloses a truncated cone, which has holes through its walls and its bottom. A cone is not a disc! In the event that the Examiner is focusing on Pellerin's Fig. 5, it should be noted that part 14 of Fig. 5 is an "upturned cone" (col. 3, lines 20-21).

In addition, Pellerin does not have an inlet channel and a mixing channel.

Accordingly, Pellerin cannot possibly anticipate or suggest Applicants static mixer module, and the rejection of claims 1, 2, 5-10 and 20 under 35 U.S.C. 102(b) as anticipated by Pellerin (US 4,295,458) should now be withdrawn.

Claims 1, 2, 5, 11-15, 18 and 21 stand rejected under 35 U.S.C. 102(b) as anticipated by King ('399).

Applicants have previously pointed out that King's mixer is not one piece, but is made from a combination of pieces that are welded or brazed together. In response, the Examiner argues that col. 4, lines 3-16 disclose a one-piece element. Precisely the point! The one-piece element that is described in col. 4, lines 3-16, and illustrated in Fig. 4 is not a *mixer*. It is a mixer "**single strand array**" which must be joined with other single strand arrays to form a mixer. This single strand array, for example, has no orifices or holes!

But read on...read col. 4, lines 10 and 11, and look at fig. 5. A plurality, in fact many, "single strand arrays" are joined together to form a mixer element. This is not one-piece, it is many pieces brought together.

While the Examiner would like to call this one piece because the individual pieces are all attached, it is clear that this is not what those skilled in the art would understand "one-piece" to mean. The points of attachment of King's "arrays" represent weak points, which are not present in Applicants' one-piece disc. A plurality of pieces brought together and attached to each other is not "one-piece", as that term is understood in the art.

"One piece construction" is a term that is well understood in the art, and the device of Fig. 5 of the King reference is not one piece construction.

The rejection of claims 1, 2, 5, 11-15, 18 and 21 under 35 U.S.C. 102(b) as

anticipated by King (5,605,399) should accordingly now be withdrawn.

Claim 11 stands rejected under 35 U.S.C. 103(a) as obvious over Pellerin in view of King. The Examiner cites King to suggest that Pellerin's device be made of non-ferrous metal. The differences between Applicants' mixer and Pellerin's truncated cone cannot in any way be overcome by a choice of materials of construction. No combination of King's material with Pellerin's design will ever arrive at Applicants' mixer module.

Accordingly, the rejection of Claim 11 under 35 U.S.C. 103(a) as obvious over Pellerin in view of King should be withdrawn.

Claim 4 stands rejected under 35 U.S.C. 103(a) as obvious over King ('399). The Examiner sees King's Figure 7 as suggesting an angle of about 30 degrees. Using an angle of 30 degrees on King's "single strand array" will not make it into a modular disc, and will not provide it with any orifices. The differences between the present invention and the King disclosure, as discussed above, are not bridged in any way by using an angle of 30 degrees in King's single strand array", and the rejection of claim 11 under 35 U.S.C. 103(a) as obvious over King ('399) should now be withdrawn.

Claims 3, 10, 17, 19 and 20 stand rejected under 35 U.S.C. 103(a) as obvious over King ('399) in view of Jeffers (US 616,191)

The Examiner relies on Jeffers for spacer contours.

Spacer contours will not in any way overcome the differences between Applicants' mixer and the device disclosed in the King reference, as discussed above.

In addition, it has previously been pointed out that the function of the members G and H of Jeffers is different from the static mixers Applicants are dealing with. As can be found on page 1, in col. 2, line 67ff of US '191 the trough like receptacles G serve as a guard preventing heavy articles from falling down into the region of the agitators C and destroying them during their operation. The transverse bars H are constructive elements holding together the receptacles G and forming a passage way through the two rows of receptacles G. In US '191 the mixing of paints is performed by the dynamic mixer C and not by any static mixing elements.

Jeffers therefore cannot be combined with US '399 because of the different technical fields (**dynamic** mixer B,C) and because of the completely different purpose of the arrangement compared to the spacer contours of Applicants' mixer modules.

Even if it was, however, Applicants' static mixer would not be arrived at, as discussed above.

The rejection of Claims 3, 10, 17, 19 and 20 under 35 U.S.C. 103(a) as obvious over King in view of Jeffers should accordingly now be withdrawn.

Claims 6-9, 22 and 17 stand rejected under 35 U.S.C. 103(a) as obvious over King in view of Hirsch.

The Examiner cites Hirsch to show a disc divided into regions or segments.

The basic differences between Applicants' device and Kings' have now been discussed at length above. Nothing in Hirsch would overcome any of them

Moreover, the flow equalizer of Hirsch US '391 has nothing to do with Applicants' static mixers. US '391 only discloses that the velocity cross section of a liquid can be equalized by flat baffles 8, 8' having orifices of a greater diameter on an outer circle than on an inner circle of the baffles. US '391 does not teach or suggest anything about the function of Applicants' mixing arrangements. The separation of a mixer module into different regions with openings of different sizes in Applicants' invention leads to different **mixing properties** in those regions. US '391 does not deal with mixing of fluids. A combination with Hirsch and King is therefore not possible because the multi piece array of King cannot be constructed in the form of regions with different apertures, especially if the regions have concentric boundaries.

The rejections of Claims 6-9, 22 and 17 under 35 U.S.C. 103(a) as obvious over King in view of Hirsch should accordingly now be withdrawn.

In view of the above amendments and remarks, it is believed that Claims 1-15

and 17-22 are now in condition for allowance. Reconsideration of said claims by the Examiner is respectfully requested and the allowance thereof is courteously solicited.

CONDITIONAL PETITION FOR EXTENSION OF TIME

If any extension of time for this response is required, applicants request that this be considered a petition therefor. Please charge the required petition fee to Deposit Account No. 14-1263.

ADDITIONAL FEE

Please charge any insufficiency of fees, or credit any excess, to Deposit Account No. 14-1263.

Respectfully submitted,
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I hereby certify that this correspondence is being transmitted via facsimile addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on January 30, 2002



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**MARKED-UP COPY OF AMENDED CLAIM,
SHOWING CHANGES RELATIVE TO PREVIOUS VERSION**

Claim 1 (three-times amended). Static mixer module, comprising a one piece disc having a front side and a rear side which is provided with a multiplicity of orifices [(6)] and which is structured on its front side [(2) facing the mix and on its rear side(3) by means of] by inlet channels [(4)] and on its rear side by mixing channels [(5)] running [in] parallel to each other or concentrically to each other, and defined by channel walls, and in which the orifices [(6) are made in the flanks (8) of the inlet channels (4) and open into the flanks (9) of] pass through the walls defining the mixing channels [(5)].

Claim 2 (twice amended). Static mixer module according to Claim 1, wherein the inlet channels [(4)], the mixing channels [(5)], or both, have straight [flanks] channel walls which are at an angle α of 5 degrees to 85 degrees to the [disc] plane [(13)] defined by the circumference of the disc, [of] on the front side of the disc [(2)], [of] to the plane defined by the circumference of the disc, on the rear side [(3)] of the disc or [of] both.

Claim 3 (twice amended). Static mixer module according to Claim 1, wherein the [flanks (8)] walls of the inlet channels [(4)], of the [flanks (9), or both, of the] mixing channels [(5)] or both are straight and are at an angle α smaller than 15

degrees to the [disc] plane [13] of] defined by the circumference of the disc, on the front side [(2) of] to the plane defined by the circumference of the disc, on the rear side [(3)], or both, and wherein the mixer module has additional spacer contours on the front side [(2)], the rear side [(3)], or on both.

Claim 4 (twice amended). Static mixer module according to claim 1, wherein the [mid-axis (16) or the wall] center-lines of the orifices [(6) in the flanks of the channels] form[s an] angles β defining ± 30 degrees to the [flank plane (17) walls through which they pass.

Claim 5 (twice amended). Static mixer module according to claim 1, wherein the inlet channels [(4)], the mixing channels [(5)], or both, have a V-shaped, U-shaped, rectangular or trapezoidal cross-sectional profile.

Claim 6 (twice amended). Static mixer module according to claim 1, wherein the mixer module is divided into two or more regions or segments which have differently arranged, differently structured, or both, inlet channels [(4)], mixing channels [(5)], or both.

Claim 8 (twice amended). Static mixer module according to claim 6, wherein the [boundaries of the] regions or segments are arranged concentrically about the center point of the mixer module.

Claim 9 (twice amended). Static mixer module according to claim 6,
wherein the spacing between the [planes of] plane defined by the circumference of
the disc, on the front side, and the [planes of] plane defined by the circumference of
the disc, on the rear side of the mixer module is different in the various regions or
segments.

Claim 10 (twice amended). Static mixer module according to claim 1,
wherein the module has [,] baffle surfaces on the front side [(2), baffle surfaces
(18,19) in the disc plane].

Claim 17 (twice amended). Mixer arrangement according to claim 22,
wherein the arrangement of the [disc-shaped static mixer] module and of the
[engaging] static mixer is designed in such a way that the [engaging] static mixer
terminates flush with either the plane defined by the circumference of the disc, [of]
on the front side of the segments or regions or the plane defined by the
circumference of the disc, on the [of] the rear side of the segments or regions, [the]
said plane having [a] the maximum spacing from the [planes of the front side or the
rear side respectively] other.

Claim 18 (twice amended). Mixer with at least two static mixer modules
according to claim 1, in which the mixer modules are installed in a pipe, through which
mix flows, in such a way that the front side of [an individual] one of said at least two

mixer modules points in the opposite direction to the direction of flow of the mix.

Claim 21 (amended). Mixer with a mixer arrangement according to claim 12, in which the mixer arrangement is installed in a pipe, through which mix flows, in such a way that the front side of one of said at least two static mixer elements [an individual mixer module from the mixer arrangement] points in the opposite direction to the direction of flow of the mix.

Claim 22 (twice amended). Mixer arrangement according to claim 12, [wherein the mixer arrangement has] comprising at least one module which is divided into two or more regions or segments [which have] each of which has different spacings between the orifices or different [cross-sectional openings of the] sizes of orifices, and wherein the spacing between the planes [planes of] plane defined by the circumference of the module, on the front side and the [planes of] plane defined by the circumference of the disc, on the rear side of the module is different in the various regions or segments, said module being followed directly by a static mixer element [which is a conventional static mixer] or a disc-shaped static mixer module[, the outer or inner contour of which is] adapted to engage [the boundaries of the regions or segments and which engages into the regions or segments of the disc-shaped static mixer module which have a smaller spacing between the disc plane of the front side and the disc plane of the rear side than the remaining regions or segments] into a void defined by the boundaries of the module.